Frequently Asked Questions about Sudden Oak Death

What is Sudden Oak Death?

Sudden Oak Death (SOD) is a new disease of California forest trees and shrubs and many horticultural plants. The disease symptoms were first reported in 1995 in Marin County and have since been found in wildlands in sixteen *additional* counties in California, from Monterey to Humboldt, and in southern Oregon (Curry County). The pathogen, *Phytophthora ramorum* (pronounced Phy-top-thor-a ra-mor-um) is a newly described species of fungus-like microorganism that was identified as the causal agent of SOD in 2000. In the brief time since, the pathogen has been found to infect a large number of California native and horticultural plant species besides oak trees. The disease has recently attracted worldwide concern after having been found in wild settings in England and the European mainland. An extensive scientific research team has been formed to study the detection, spread, interaction with other host species, possible control measures, biomass removal, etc. State, National and International quarantines have been established to help to prevent the spread of this disease.

What plants can be host to *Phytophthora ramorum* in our region?

This list is frequently updated. For the most current and more detailed information visit www.suddenoakdeath.org.

Overstory trees

bigleaf maple (*Acer macrophyllum)*
black oak (*Quercus kelloggii)*
California bay laurel/Oregon myrtle (*Umbellularia californica)*
California buckeye (*Aesculus californica),*
canyon live oak (*Quercus chrysolepis*)
coast live oak (*Quercus agrifolia)*
coast redwood (*Sequoia sempervirens*)
Douglas-fir *(Pseudotsuga menziesii)*
Grand fir *(Abies grandis)*
madrone (*Arbutus menziesii)*
Shreve's oak (*Quercus parvula* var. *Shrevei)*
tanoak (*Lithocarpus densiflorus)*

Understory trees and shrubs

California coffeeberry (*Rhamnus californica)*
California hazelnut (*Corylus cornuta*)
California rhododendron (*Rhododendron macrophyllum*)
California honeysuckle (*Lonicera hispidula)*
cascara (*Rhamnus purshiana*)
common manzanita (*Arctostaphylos manzanita)*
evergreen huckleberry (*Vaccinium ovatum)*
poison-oak (*Toxicodendron diversilobum*)
salmonberry (*Rhubus spectabilis*)
toyon (*Heteromeles arbutifolia)*
wood rose *(Rosa gymnocarpa)*

Horticultural plants and herbs

Camellia (various species and varieties)
drooping leucothoe *(Leucothoe fontanesiana)*
European beech *(Fagus sylvatica)*
European yew *(Taxus baccata)*
horsechestnut *(Aesculus hippocastanum)*
lilac *(Syringa vulgaris)*
lingonberry *(Vaccinium vitis-idaea)*
mountain-laurel *(Kalmia latifolia)*
Pieris (various species and varieties)
strawberry tree *(Arbutus unedo)*
sweet chestnut *(Castanea sativa)*
Viburnum (various species and varieties)
Victorian box (*Pittosporum undulatum*)
western starflower (*Trientalis latifolia*)
witch hazel *(Hamamelis virginiana)*
various oak species of eastern U.S. and European origin

What are the symptoms of Sudden Oak Death?

It is important to remember that all of these plants are also affected by other diseases that may look similar to *Phytophthora ramorum.* Field identification of this pathogen is not possible and requires laboratory confirmation. The descriptions below are given to provide some summary of the visible signs of this disease and its variability between plants.

Overstory trees

- In **coast live oak, black oak, and canyon live oak, Shreve's oak**, the earliest symptom is the appearance of a bleeding canker often with burgundy-red to tar-black thick sap oozing on the bark surface of the tree bole (and not below the root crown). However, bleeding is a non-specific tree response that can be caused by other organisms or wounding. Small black conks and bark beetles may also be present with SOD. **Tanoak** is especially susceptible to the pathogen. The bleeding symptom is often present though it is less viscous. New growth may droop or discolor.
- **Bay laurel** symptoms are confined to brown to grey leaf lesions, often surrounded by a chlorotic (yellowish) zone. The lesions are most frequent at the leaf tip and generally have a blackened line at the border. Plant mortality has not been reported. California bay is one of the easier plant species on which to recognize the disease in the field, although anthracnose can also cause similar symptoms.
- In **bigleaf maple**, *P. ramorum* foliar infection causes a leaf scorch, usually starting from the edges of the leaf. This scorching has irregular borders and does not follow the leaf contour. Lesions vary in color from orange to brown. There have been few observations of the disease on bigleaf maple.

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- **California buckeye** symptoms include brown leaf spots or darkened lesions on the petioles and twigs. Early symptoms start as rounded individual spots that tend to coalesce later in the season. The symptoms are very similar to buckeye anthracnose. Early summer leaf loss in response to drought is normal and not due to SOD.
- **Coast redwood** symptoms include needle lesions, development of cankers on small branches (<1" dbh) throughout the crowns of small saplings, and dieback of epicormic sprouts. The pathogen can also cause mortality of basal shoots on mature redwood trees. To date the diseases is not known to be on adult tree trunks.
- **Douglas-fir** symptoms include cankers on small branches of saplings that cause wilting of new shoots, needle loss, and branch die-back, while in smaller saplings, death of the leader and top branch whorls can occur. The pathogen has been confirmed from only one site in Sonoma County in an area with heavily infected overstory bay trees.
- **Pacific madrone** symptoms include purplish leaf spots, and stem cankers that appear as blackened areas on twigs. At the advanced stages, the entire leaf and shoot blacken and die. Both juvenile and adult plants are affected. *Botryosphaeria* and *Natrassia* are other pathogens that cause very similar symptoms, making it very difficult to recognize the disease in the field.

Understory trees, shrubs and horticultural plants *(The disease is not well understood on many of these plants.)*

- **California coffeeberry, lingonberry, mountain-laurel, *Camellia,* and *Pieris*** symptoms include dark foliar lesions that vary in size from small leaf spots to large lesions covering half the leaf. Lesion margins are often diffuse rather than precisely defined. Lesions on *Camellia* and *Pieris* are located mainly at the edges or tips of leaves, and infected leaves often drop early. Symptoms on *Pieris,* but not *Camellia,* often include branch tip dieback.
- **California honeysuckle** symptoms include lesions with concentric rings.
- **California rhododendron** symptoms include leaf lesions and twig dieback, and in rare instances mortality. Leaf lesions appear as brown spots having diffuse margins (rather than sharp margins as caused by sunburn injury) where water accumulates, and generally do not involve the midrib of the leaf. Additional symptoms are blackened shoots with or without foliage still attached. Nursery varieties are also susceptible to this pathogen and many other *Phytophthora* species in general.
- **Evergreen huckleberry** symptoms include twig cankers and cane dieback. The small, blackened twig cankers may be dried and/or wilted. It is common to see patches of dead and live branches.
- **Lilac** symptoms include lesions on leaf edges as well as the death of entire leaf buds. This leaf bud death can appear very similar to twig dieback.
- **Manzanita** and **strawberry tree** symptoms are likely to be similar to madrone with dark branch cankers that can travel quickly throughout stem and may infect the leaves. The water-soaked appearance of the cankers and the absence of black fungal reproductive structures (pycnidia) may help distinguish the pathogen from *Botryosphaeria*.
- **Toyon** symptoms include dark foliar lesions, at times demarked by a thick black line where water accumulates. Less prominent foliar spots, branch lesion, and unusual death of entire plants have been reported.
- ***Viburnum*** symptoms include stem cankers and leaf lesions. Stem cankers often form at the plant base, girdling the plant and causing a wilt that eventually kills the plant. Cankers can also occur on plant branches. Leaf lesions can grow through the leaf and onto petioles or stems to form girdling cankers.
- **California hazelnut, cascara, Eastern and European oak species, European beech, European yew, Grand fir, horsechestnut, poison-oak**, **salmonberry, sweet chestnut, witch hazel, Victorian box:** Leaf spot or possible twig cankers could be expected symptoms of these species. Bleeding stem cankers occur in poison-oak, horsechestnut, a Mediterranean oak (*Quercus sativa)*, and European beech.

Whom do I contact if I suspect Sudden Oak Death or to learn more about the regulations?

Jeff Dolf (jdolf@co.humboldt.ca.us; 707 445-7223), Trinity & Humboldt County Agriculture Commissioner, 5630 South Broadway Street, Eureka CA, 95501.

Where can I learn more about Sudden Oak Death?

For the most current information about sudden oak death, including photos of the host species symptoms, visit the California Oak Mortality Task Force website (www.suddenoakdeath.org), or locally contact:

Ryan DeSantis (rdesantis@ucanr.edu; 530-224-4900), Forestry/Natural Resources Advisor, University of California Cooperative Extension, 1851 Hartnell Avenue, Redding CA 96002, or Chris Lee (christopher.lee@fire.ca.gov; 707-726-1254), Forest Pest Specialist and Sudden Oak Death Project Coordinator, California Department of Forestry and Fire Protection, 118 South Fortuna Boulevard., Fortuna, CA 95540.